



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB2000-0081

May 3, 2000

Mr. Lawrence C. Evans
U.S. Army Corps of Engineers
Portland District, CENWP-CO-GP
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Bank Stabilization on Boulder Creek, Tillamook County, Oregon (Permit ID No. 2000-00090)

Dear Mr. Evans:

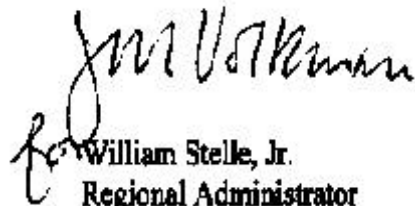
Enclosed is the National Marine Fisheries Service's (NMFS) biological opinion for the proposed issuance of a Clean Water Act section 404 permit (Permit ID No. 2000-00090) authorizing Tillamook County to reconstruct and riprap 60 feet of bankline on Boulder Creek (River Mile 1.1) near Beaver, Oregon. The U.S. Army Corps of Engineers requested formal consultation in a letter dated March 15, 2000. NMFS received the request for consultation and a biological assessment describing the proposed action on March 17, 2000. Tillamook County has applied for the subject permit and is the designer and builder of the proposed project.

This biological opinion considers the potential effects of the proposed action on Oregon Coast coho salmon (*Oncorhynchus kisutch*) which occur in the proposed project area. Oregon Coast coho salmon were listed as threatened under the ESA on August 10, 1998 (63 FR 24998), and critical habitat was designated on February 16, 2000 (65 FR 7764). NMFS concludes that the proposed action is not likely to jeopardize the subject species, or destroy or adversely modify critical habitat. Included in the enclosed opinion is an incidental take statement with terms and conditions to minimize the take of the subject species.



If you have any questions regarding this letter, please contact Scott Carlon of my staff in the Oregon State Branch Office at (503) 231-2379.

Sincerely,



William Stelle, Jr.
Regional Administrator

Endangered Species Act

Section 7 Consultation

Biological Opinion

Bank Stabilization on Boulder Creek, Permit ID No. 2000-90,
Tillamook County, Oregon

Agency: U.S. Army Corps of Engineers, Portland District

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: May 3, 2000

Refer to: OSB2000-0081

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I. BACKGROUND

Boulder Creek, a tributary to the Nestucca River in Tillamook County, has been steadily eroding a 45-foot section of bankline and has begun to erode Boulder Creek Road at river mile 1.1 near Beaver, Oregon. The existing road is cut into an incline making relocation of the road higher on the slope unfeasible. Accordingly, Tillamook County (County) has applied for a permit from the U.S. Army Corps of Engineers (Corps) to reconstruct and riprap approximately 60 feet of bankline and road. The Corps proposes to issue the permit (Permit ID No. 2000-90), pursuant to section 404 of the Clean Water Act, authorizing the County to complete the proposed action.

Boulder Creek may support Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*) which were listed as threatened pursuant to the Endangered Species Act (ESA) by the National Marine Fisheries Service (NMFS) on August 10, 1998 (63 FR 42587). Boulder Creek does occur within designated critical habitat for this species (February 16, 2000, 65 FR 7764).

The Corps determined that issuance of the subject permit would likely adversely affect OC coho salmon and requested formal consultation in a letter dated March 15, 2000. NMFS received the consultation request, along with a biological assessment, on March 17, 2000. The objective of this biological opinion is to determine whether the proposed action is likely to jeopardize the continued existence of OC coho salmon or destroy or adversely modify designated critical habitat for this species.

II. PROPOSED ACTION

Approximately 60 feet of Boulder Creek would be relocated back to its original channel. This would entail placing roughly 360 cubic yards (cy) of fill to reconstruct the road and the eroded section of bankline. Approximately 140 cy would be placed below the ordinary high water line, of which 40 cy would be 2- to 3-foot diameter rock and 100 cy of pit-run material.

The bank would be contoured to a 1:1 slope when completed. Willows would be planted, following Oregon Department of Fish and Wildlife (ODFW) criteria, within and upslope of the riprap and pit run fill. All work would be accomplished during ODFW's in-water work window of July 1-September 15.

III. BIOLOGICAL INFORMATION AND CRITICAL HABITAT

Although there are currently limited data to assess population numbers or trends, NMFS believes that all coho salmon stocks comprising the OC coho salmon ESU are depressed relative to past abundance. The status and relevant biological information concerning OC coho salmon are well described in the proposed and final rules from the Federal Register (July 25, 1995, 60 FR 38011; and May 6, 1997, 62 FR 24588, respectively), and Weitkamp *et al.* (1995).

Abundance of wild coho salmon spawners in Oregon coastal streams declined during the period from about 1965 to roughly 1975 and has fluctuated at a low level since that time (Nickelson *et al.* 1992). Spawning escapements for this ESU may be at less than 5% of abundance from that in the early 1900s. Contemporary production of coho salmon may be less than 10% of the historic production (Nickelson *et al.* 1992). Average spawner abundance has been relatively constant since the late 1970s, but preharvest abundance has declined. Average recruits-per-spawner may also be declining. The OC coho salmon ESU, although not at immediate danger of extinction, may become endangered in the future if present trends continue (Weitkamp *et al.* 1995).

Timing of adult coho salmon river entry is largely influenced by river flow. Coho salmon normally wait for freshets before entering rivers. In the Nestucca River, adults return between October and January with peak upstream migration usually occurring in October when the fall rains return. OC coho salmon spawn in the Nestucca River basin between mid-November and mid-December with peak spawning occurring in late November to early December. Juvenile coho salmon rear for 1 year in fresh water before migrating to the ocean. Juvenile OC coho salmon migrate out of the Nestucca River basin as smolts between mid-March and mid-June. Peak outmigration typically occurs in late April to early May (Weitkamp *et al.* 1995).

Critical habitat for OC coho salmon includes Oregon coastal river basins (freshwater and estuarine areas) between Cape Blanco and the Columbia River. Freshwater critical habitat includes all waterways, substrates, and adjacent riparian areas—areas adjacent to a stream that provides the following functions: shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter—below longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and several dams that block access to former coho salmon habitat. The proposed action would occur in designated critical habitat for OC coho salmon.

IV. EVALUATING PROPOSED ACTIONS

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of (1) defining the biological requirements and current status of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In

making this determination, NMFS must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. If NMFS finds that the action is likely to jeopardize the listed species, NMFS must identify reasonable and prudent alternatives for the action.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' designated critical habitat. NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. If NMFS concludes that the action will destroy or adversely modify critical habitat, it must identify any reasonable and prudent measures available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for migration, spawning, and rearing of OC coho salmon under the existing environmental baseline.

A. Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NMFS also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NMFS starts with the determinations made in its decision to list OC coho salmon for ESA protection and also considers new data available that is relevant to the determination (Weitkamp *et al.* 1995).

The relevant biological requirements are those necessary for OC coho salmon to survive and recover to naturally reproducing population levels at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful spawning, rearing, and migration. The current status of the OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed and, in some cases, their status may have worsened.

B. Environmental Baseline

The environmental baseline is an analysis of the effects of past and on-going human and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The

action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects may occur throughout the watershed where actions described in this opinion lead to additional activities or affect ecological functions contributing to stream degradation. For this consultation, the action area includes the immediate project site on Boulder Creek and downstream to its confluence with the Nestucca River (roughly 1.5 stream miles).

The bulk of production for the OC coho salmon ESU is skewed to its southern portion where the coastal lake systems (e.g. Tenmile, Tahkenitch, and Siltcoos Basins) and the Coos and Coquille Rivers are more productive. The proposed action area is located in the northern half of the ESU where production is more depressed and habitat in the action area is underseeded.

The Nestucca River originates in the coast mountain range and flows roughly 53 miles to the Pacific Ocean. Most of the precipitation in the Nestucca Basin occurs as rain with roughly 80% falling from October through March. Boulder Creek enters the Nestucca River at river mile 20.5. The creek originates on the Siuslaw National Forest and flows roughly 5.8 miles to the Nestucca River. The lower half of the creek is bordered by private land. Riparian vegetation consists mostly of alder, willows, and herbaceous plants. OC coho salmon likely use Boulder Creek for spawning and rearing with the immediate project area likely used as a migration corridor.

V. ANALYSIS OF EFFECTS

A. Effects of Proposed Actions

Roads constructed in mountainous terrain, such as the subject county road, are commonly located next to stream channels due to the extreme grade on the hillsides, making a road dangerous to construct and maintain, significantly increasing the probability for slope failure, and thus are generally cost prohibitive. However, impacts to the stream channel from this type of road location include significant increases in sediment delivery, elevated erosion, disruption of subsurface flows, increased peak flows, reduced shading, and reduced recruitment of large wood to the stream channel (Rhodes *et al.* 1994).

Furthermore, placement of roads near streams typically requires construction of revetments, which simplifies stream channels, alters hydraulic processes, and precludes natural channel adjustments (Spence *et al.* 1996). Some of these general effects would continue in the long-term as the alignment of the exiting roadway would be maintained. Moreover, placement of riprap may shift the erosion point either upstream or downstream of the proposed project site. However, excessive contributions of sediment would be reduced by stabilizing the eroding bankline.

Soils exposed during earthwork activities and fill materials placed adjacent to the stream channel could be carried into Boulder Creek during a rain event. To minimize the potential for sediment entry into the river, standard best management practices (BMP) would be implemented. Moreover, the proposed project would occur during the dry season, further reducing the potential for heavy contributions of sediment due to soil disturbance from construction activities.

As with all construction activities, there is potential for accidental release of fuel, oil, and other contaminants. To minimize this potential, all equipment would be clean and free of contaminants and fluid leaks. All equipment would be serviced away from any water bodies. An emergency spill containment kit would be kept on site during the duration of the project. Finally, Best Management Practices required by the Corps and/or the State of Oregon would further minimize the potential for accidental release of hazardous materials.

B. Effects on Critical Habitat

The NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features of designated critical habitat include substrate, water quality, water quantity, water temperature, food, riparian vegetation, access, water velocity, space and safe passage. The proposed action area would occur within designated critical habitat for OC coho salmon.

The presence of the roadway likely affects critical habitat in the long-term by restricting natural channel forming processes, altering stream hydrology, reducing riparian vegetation, increasing stream temperature, and reducing allochthonous input. In addition, Peters *et al.* (1998) found that densities of juvenile coho salmon were generally reduced at riprapped sites when compared to areas containing large woody debris or undercut banks. Willows planted within and around the riprap may provide shade, cover, and allochthonous input in the long-term.

Short-term impacts resulting from the proposed action could occur from sediment and turbidity during in-water construction activities and storm events during construction. These effects would be largely ameliorated by project timing (i.e., dry season) and implementation of BMPs. Improvements over current conditions are expected from stabilizing the road and vegetating the bank revetment, serving to reduce or eliminate chronic inputs of sediment from the project site.

C. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

The NMFS is not aware of any future new (or changes to existing) non-Federal activities within the action area that would cause greater impacts to listed species than presently occurs. The NMFS assumes that future private and state actions will continue at similar intensities as in recent years.

VI. CONCLUSION

Based on the available information, NMFS has determined that the proposed action is not likely to jeopardize the continued existence of OC coho salmon or adversely modify proposed critical habitat. In reaching this conclusion, NMFS determined that the survival and recovery of OC coho salmon would not be appreciably diminished by the proposed action. In summary, our conclusion is based on: (1) All in-water work would be completed during ODFW's designated in-water work window of July 1-September 15, which would preclude the presence of migrating and spawning OC coho salmon and allow work to occur during the dry season; (2) implementation of erosion and sediment control measures which would minimize effects on OC coho salmon habitat and minimize displacement of rearing juvenile OC coho salmon should any be present in the proposed action area during in-water construction; (3) potential effects from chemical contamination would be minimized or possibly eliminated as all refueling and servicing would not occur near any water bodies, equipment would be free of leaks and contaminants, and a Spill Prevention Control and Countermeasures Plan would be established; (4) placement of riprap may result in a reduction of rearing habitat in the short-term, but current conditions at the site does not provide rearing habitat and the addition of riparian vegetation may provide shade and allocthonous input in the long-term; and (5) stabilizing the site would reduce or eliminate a chronic source of sediment.

VII. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information. NMFS has no additional conservation recommendations regarding the action addressed in this opinion.

VIII. REINITIATION OF CONSULTATION

Reinitiation of consultation is required: (1) If the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this biological opinion; (2) new information or project monitoring reveals

effects of the action that may affect the listed species in a way not previously considered; or (3) a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16).

IX. REFERENCES

Section 7(a)(2) of the ESA requires biological opinions to be based on the best scientific and commercial data available. This section identifies the data used in developing this Opinion.

Nickelson, T. E., J. W. Nicholas, A. M. McGie, R. B. Lindsay, D. L. Bottom, R. J. Kaiser, and S. E. Jacobs. 1992. Status of anadromous salmonids in Oregon coastal basins. Oregon Department of Fish and Wildlife, Research Development Section and Ocean Salmon Management, 83 p. Oregon Department of Fish and Wildlife, P.O. Box 59, Portland.

Peters, Roger J., Brian R. Missildine, and David L. Low. 1998. Seasonal fish densities near river banks stabilized with various stabilization methods. U.S. Fish and Wildlife Service, Lacey, Washington. 32p.

Rhodes, Jonathan J., Dale A. McCullough, and F. Al Espinosa, Jr. 1994. A course screening process for potential applications in ESA consultations. Technical Report 94-4, prepared for the National Marine Fisheries Service, Portland, Oregon. 127 p. plus appendices.

Spence, B. C., G. A. Lomnický, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, Oregon. (Available from the National Marine Fisheries Service, Portland, Oregon). 356 p.

Weitcamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. U.S. Dep. Commer., NOAA Tech Memo. NMFS-NWFSC-24, Northwest Fisheries Science Center, Seattle, Washington. 258 p.

X. INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to,

breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. If necessary, it also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of Take

The NMFS anticipates that the proposed action covered by this biological opinion has more than a negligible likelihood of incidental take of juvenile OC coho salmon resulting from short term pulses of suspended sediment and a potential reduction of rearing habitat due to the use of riprap. Effects of actions such as these are largely unquantifiable in the short term, and are not expected to be measurable as long term effects on the species' population levels. The effects of these activities on population levels are also largely unquantifiable and not expected to be measurable in the long term. This is because the impacts are relatively small and not expected to appreciably add to cumulative effects.

Therefore, even though NMFS expects some low level of incidental take to occur due to the action covered by this biological opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as this, the NMFS designates the expected level of take as unquantifiable. Based on the information provided, NMFS anticipates that an unquantifiable but low level of incidental take could occur as a result of the action covered by this biological opinion. Moreover, the small amount of take that may occur is expected to be non-lethal.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. Minimizing the amount and extent of take is essential to avoid jeopardy to the listed species.

1. To minimize the amount and extent of incidental take from construction activities within the proposed action area, measures shall be taken to limit the duration and extent of in-water work, and to time such work to occur when the impacts to fish are minimized.
2. To minimize the amount and extent of incidental take from construction activities in or near watercourses, effective erosion and pollution control measures shall be developed and

implemented to minimize the movement of soils and sediment both into and within watercourses and to stabilize bare soil over both the short term and long term.

3. To minimize the amount and extent of take and to minimize impacts to critical habitat, measures shall be taken to minimize impacts to riparian and in-stream habitat, or where impacts are unavoidable, to replace lost riparian and in-stream function.
4. To ensure effectiveness of implementation of the reasonable and prudent measures, all erosion control measures shall be monitored and evaluated both during and following construction and meet criteria as described below in the terms and conditions.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. In-water work:
 - a. Passage shall be provided for both adult and juvenile forms of all salmonid species throughout the construction period.
 - b. All work within the ordinary high water mark of all anadromous fish-bearing systems, or in systems which could potentially contribute sediment or toxicants to downstream fish-bearing systems, will be completed within ODFW's in-water work period for the Nestucca River of July 1 to September 15.
 - c. Alteration or disturbance of stream banks and existing riparian vegetation will be minimized.
 - d. No pollutant of any kind (petroleum products, silt, etc.) shall come in contact with the river.
2. Erosion and Pollution Control
 - a. Erosion Control measures shall include (but not be limited to) the following:
 - i. Erosion control blankets or heavy duty matting (e.g., jute) may be used on steep unstable slopes in conjunction with seeding or prior to seeding.

- ii. Sills or barriers may be placed in drainage ditches along cut slopes and on steep grades to trap sediment and prevent scouring of the ditches. The barriers will be constructed from rock and straw bales.
 - iii. Biobags, weed-free straw bales and loose straw may be used for temporary erosion control. Temporary erosion and sediment controls will be used on all exposed slopes during any hiatus in work on exposed slopes.
- b. Effective erosion control measures shall be in-place at all times during the contract. Construction within the 5-year flood plain will not begin until all temporary erosion controls (e.g., straw bales, silt fences) are in-place, downslope of project activities within the riparian area. Erosion control structures will be maintained throughout the life of the contract.
- c. All temporarily-exposed areas will be seeded and mulched. Erosion control seeding and mulching, and placement of erosion control blankets and mats (if applicable) will be completed on all areas of bare soil within 7 days of exposure within 150 feet of waterways, wetlands or other sensitive areas. All other areas will be stabilized within 14 days of exposure. Efforts will be made to cover exposed areas as soon as possible after exposure.
- d. All erosion control devices will be inspected during construction to ensure that they are working adequately.
- e. Sediment will be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they will be staked and dug into the ground 12 cm. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.
- f. Where feasible, sediment-laden water created by construction activity shall be filtered before it leaves the right-of-way or enters an aquatic resource area. Silt fences or other detention methods will be installed as close as possible to culvert outlets to reduce the amount of sediment entering aquatic systems.
- g. A supply of erosion control materials (e.g., straw bales and clean straw mulch) will be kept on hand to cover small sites that may become bare and to respond to sediment emergencies.
- h. All equipment that is used for in-water work will be cleaned prior to entering the two-year flood plain. External oil and grease will be removed, along with dirt and mud. Untreated wash and rinse water will not be discharged into streams and rivers without adequate treatment.

- i. On cut slopes steeper than 1:2, a tackified seed mulch will be used so that the seed does not wash away before germination and rooting occurs. In steep locations, a hydro-mulch will be applied at 1.5 times the normal rate.
 - j. Material removed during excavation shall only be placed in locations where it cannot enter sensitive aquatic resources. Conservation of topsoil (removal, storage and reuse) will be employed.
 - k. Measures will be taken to prevent construction debris from falling into any aquatic resource. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.
 - l. Project actions will follow all provisions of the Clean Water Act (40 CFR Subchapter D) and Oregon Department of Environmental Quality's (DEQ) provisions for maintenance of water quality standards not to be exceeded within the Nestucca River (OAR Chapter 340, Division 41). Toxic substances shall not be introduced above natural background levels in waters of the state in amounts which may be harmful to aquatic life. Any turbidity caused by this project shall not exceed DEQ water quality standards.
 - m. The Contractor will develop an adequate, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (PCP), and is responsible for containment and removal of any toxicants released. The PCP shall include the following:
 - i. A site plan and narrative describing the methods of erosion/sediment control to be used to prevent erosion and sediment for contractor's operations related to disposal sites, borrow pits operations, haul roads, equipment storage sites, fueling operations and staging areas.
 - ii. A spill containment and control plan that includes.
 - n. No surface application of nitrogen fertilizer will be used within 50 feet of any aquatic resource.
3. Riparian Habitat Protection Measures
- a. Boundaries of the clearing limits will be flagged by the project inspector. Ground will not be disturbed beyond the flagged boundary.

- b. Alteration of native vegetation will be minimized. Whenever trees or shrubs must be removed during the course of the project, the above ground portion of the vegetation will be pruned or cut so that the roots are left intact. This will reduce erosion while still allowing room to work.
 - c. Riparian understory and overstory vegetation removed will have a replacement rate of 1.5:1. Replacement will occur within the project vicinity where possible. Any disturbed riparian areas must be planted with trees and shrubs, at a minimum.
4. Monitoring
- a. All significant riparian replant areas will be monitored to insure the following:
 - i. Finished grade slopes and elevations will perform the appropriate role for which they were designed.
 - ii. Plantings are performed correctly and have an adequate success rate.
 - c. Failed plantings and structures will be replaced, if replacement would potentially succeed.